

Patent #1876

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	:	
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Hans Uwe FAUST, et al.	:	
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For: A POLYMER DISPERSION COMPRISING PARTICLES	:	
OF POLYURETHANE AND A COPOLYMER OR	:	
TERPOLYMER PRODUCED BY EMULSION	:	
POLYMERISATION OF OLEFINICALLY UNSATURATED:	:	
MONOMERS	:	

PRELIMINARY AMENDMENT

Commissioner for Patents
Box PCT
Washington, DC 20231

Attn: DO/EO/US

Sir:

Prior to examining this application, please enter the amendments that follow:

In the Claims:

Please cancel claims 1-16.

Please enter the following claims 17 - 34:

17. A polymer dispersion comprising:

- a) an aqueous continuous phase; and
- b) dispersed particles of
 - 1) a polyurethane, wherein said polyurethane is formed from organic, non-aromatic isocyanates having a functionality of at least 2, wherein said polyurethane has a high degree of crystallinity and those crystalline phase has a melting point of between 25°C and 70°C; and

- 2) an emulsion copolymer or terpolymer having a Tg of between -20°C and $+50^{\circ}\text{C}$, wherein said polymer is formed from ethylenically unsaturated monomers containing only C, H, O, and/or N atoms, and wherein said polymer is formed from 0.5 to 15 percent by weight of at least one monomer containing at least one nitrile group, based on the total weight of monomers, wherein the ratio of polyurethane to emulsion polymer is between 50:50 and 10:90; wherein the particles of the dispersion are in the form of multiphase particles comprising said polyurethane and said polymer; and wherein said dispersion is formed by emulsion polymerization of the monomers in the presence of a polyurethane dispersion, and wherein said polymer dispersion has a solids level of from 30 to 70 percent by weight.
18. The polymer dispersion of claim 17 wherein said emulsion copolymer or terpolymer is formed from monomers comprising vinyl monomers, acrylic monomers, methacrylic monomers, and mixtures thereof.
19. The polymer dispersion of claim 17 wherein said emulsion copolymer or terpolymer further comprises up to 10 percent by weight of the total monomers of at least one monomer having a functionality selected from the group consisting of aceto acetoxy, hydroxyl, and methylol functionalities, or a mixture thereof.
20. The polymer dispersion of claim 17 wherein said emulsion copolymer or terpolymer comprises from 3 to 12 percent by weight of acrylonitrile, methacrylonitrile, or a mixture as the monomer or monomers containing at least one nitrile group.
21. The polymer dispersion of claim 19 wherein said copolymer or terpolymer comprises 0.5 to 7 percent by weight of N-methylolacrylamide, methacrylonitrile, or a mixture thereof.
22. The polymer dispersion of claim 17 wherein said emulsion copolymer or terpolymer comprises:
 - a) 75 to 98.9 percent by weight of at least one C_{1-18} alkyl esters of acrylic acid, methacrylic acid, or a mixture thereof;
 - b) 1 to 15 percent by weight of at least one monomer containing at least one nitrile group; and
 - c) 0.1 to 10 percent by weight of at least one monomer containing a hydroxyl group, an aceto-acetoxy group, or a mixture thereof.
23. The polymer dispersion of claim 22 wherein said emulsion copolymer or terpolymer comprises:
 - a) 81 to 96.5 percent by weight of at least one C_{1-18} alkyl esters of acrylic acid, methacrylic acid, or a mixture thereof;
 - b) 3 to 12 percent by weight of at least one monomer containing at least one nitrile group; and
 - c) 0.5 to 7 percent by weight of at least one monomer containing a hydroxyl group, an aceto-acetoxy group, or a mixture thereof.

24. The polymer dispersion of claim 22, wherein said monomer containing a hydroxyl group, an acetoacetoxy group consists of N-methylolacrylamide, methacrylimide, acetoacetoxy-ethyl(meth)acrylate, or a mixture thereof.
25. The polymer dispersion of claim 17 wherein said polyurethane is formed by the condensation reaction between a polyol and excess organic, non-aromatic isocyanate having a functionality of at least 2, followed by chain extension with a diamine, polyamine, or mixture thereof.
26. The polymer of claim 25 wherein said organic non-aromatic isocyanate comprises 1,1'-methylenebis(4,4'-isocyanato)cyclohexane, 1,6-hexanediisocyanate, isoporone diisocyanate, or a mixture thereof.
27. The polymer dispersion of claim 25 wherein said polyol is a polyester- or polyether-based polyol.
28. The polymer of claim 17, wherein said polyurethane crystalline phase has a melting point of from 30°C to 60°C, as determined by Differential Scanning Calorimetry.
29. The polymer dispersion of claim 17 wherein the pH of the aqueous phase is from 4 to 9.
30. The polymer dispersion of claim 29 wherein the pH of the aqueous phase is from 6 to 8.
31. The polymer dispersion of claim 17 wherein said aqueous phase contains an emulsifying agent comprising one or more nonionic surfactants, anionic surfactants, and mixtures thereof.
32. A process for heat seal laminating comprising:
- applying the polymer dispersion of claim 17 to a substrate;
 - drying said polymer dispersion;
 - contacting said polymer dispersion-coated substrate with a second substrate;
 - heating the two substrates at the point where the dried polymer dispersion touches both substrate, to heat-seal the two substrates.
33. The process of claim 32 wherein said heat seal laminating process comprises a 3-D laminating process.
34. The process of claim 32, wherein said first and second substrate are each independently selected from the group consisting of wood, plastic, textile, foil, and foam.

REMARKS

Claims 1-16 were originally filed in PCT/EP 01/06190. Claims 1-16 have been canceled and claims 17 to 34 added. Support for the new claims is found in original claims 1-16.. It is believed no new matter is added by this amendment.

Examination and allowance of the new claims are earnestly solicited. If any fees are due for entering this amendment, please charge such fees to our Deposit Account No. 14-0455.

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